

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of:

Data Sought on Uses of Spectrum

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GN Docket No. 09-47, 09-51, 09-137

COMMENTS—NBP PUBLIC NOTICE # 26

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SUMMARY

Mobile broadband is rapidly becoming the Internet access delivery platform of choice in many markets, and is particularly well suited to covering rural areas. To do this however, requires not only access to sufficient spectrum for coverage and capacity, but also that the spectrum be harmonized, as far as possible, internationally. Frequency harmonization enables consumers to benefit from a multitude of readily available low cost devices. International harmonization can only be effectively achieved by international cooperation through organizations such as CITEL and the ITU-R . The Commission should give consideration to attempting to ensure that spectrum identified for mass market services such as mobile broadband, is, as far as possible, likely to find favor with other Administrations in the same regions as the United States as well as beyond.

Ideally, newly allocated mobile broadband spectrum should be in contiguous blocks, and such blocks should be large enough to accommodate the wider channels that new mobile broadband technologies such as LTE require. The bands currently deployed for over-the-air television broadcasting are attractive for mobile broadband use because of their geographic reach and indoor penetration. As the demand for mobile capacity grows, access to spectrum from these bands will help ensure consumers in areas difficult to cover with higher frequency bands have access to the higher data rates they will have come to expect and demand. Given the impact of frequency on antenna size, and the need for multiband mobile devices, it is more likely appropriate to award spectrum from the top end of television broadcast band (starting at 698 MHz) for mobile services.

Global trends on the demand for terrestrial broadcasting seem to indicate that viewer audiences are fragmenting as more and more of them are turning to niche channels. Studies

undertaken in Europe suggest that as viewer numbers fall, the case for using spectrum to provide such services becomes weaker. This is because with very small audiences per channel, it becomes more cost effective to deliver such content on-line.

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I. INTRODUCTION

Founded in 1987, the GSM Association (“GSMA”) is the global trade association of the mobile industry, representing more than 750 GSM and 3G mobile phone operators across 218 countries and territories of the world. In addition, more than 180 manufacturers and suppliers support the Association's initiatives as associate members. The primary goals of the GSMA are to ensure that mobile phones and wireless services work globally and are easily accessible, enhancing their value to individual customers and national economies, while creating new business opportunities for operators and their suppliers. The Association's members represent more than 4 billion mobile and 3G connections.

The GSMA plays a pivotal role in the development of not only the GSM platform but the entire global wireless industry. Much of the GSMA's work is focused on two areas: Emerging Services and Developing Markets. The GSMA helps its members develop and launch new services, ranging from mobile instant messaging to video sharing to mobile Internet access, which will work across networks and across national boundaries. At the same time, the GSMA is heavily engaged in the industry's push to extend basic voice, text and broadband access

services to more people and assisting Administrations in developing communications infrastructure in their countries.

The GSMA welcomes the opportunity to provide comments on this important issue. We will focus our response on those areas where we believe we can add most value, specifically our international experience, and the importance of spectrum harmonization - to ensure low cost device availability. The GSMA believes that the over-the-air television bands offer a unique opportunity to provide access to spectrum that will not only help to boost geographic coverage of mobile broadband services, but can also offer scope for widespread international harmonization. Such widespread international harmonization can have a dramatic effect on equipment costs (and technical performance), and hence be of direct benefit to consumers.

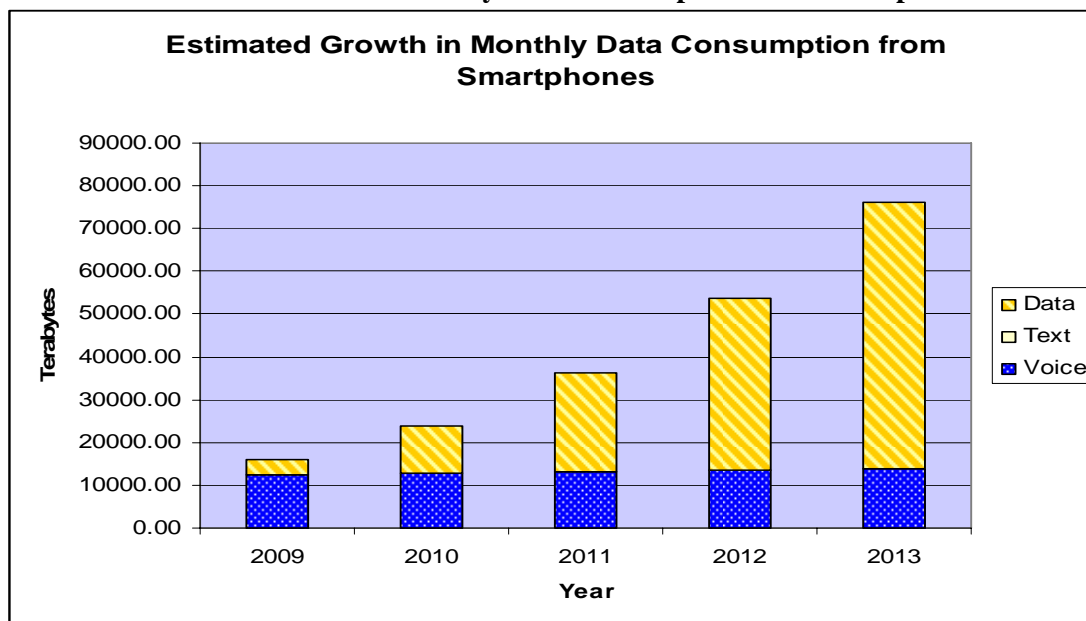
The vital importance of spectrum to help provide the telecommunication services that consumers most value, is well known.¹ In the US there are nearly 115 million users of mobile broadband technologies, with around 36 million² using HSPA.³ The number of users expected to be using mobile broadband is expected to grow almost exponentially, and to overtake fixed subscribers by the year 2011. However for this to happen requires that enough harmonized spectrum be made available to provide both coverage and capacity. We have seen in the US the growth in demand for data from mobile subscribers.

¹ For example see Global View Partners report on Mobile Broadband in the Americas, http://www.gsmworld.com/documents/momentum_building_in_the_aws_band_report.pdf

² Wireless Intelligence

³ Data optimised WCDMA technology evolved from GSM technology.

Estimated Growth in Monthly Data Consumption from Smartphones⁴



The question of how to balance the need for spectrum for over-the-air television and wireless broadband services is however central to the questions raised here. In principle this would be done via a thorough cost benefit analysis of the social and economic value of spectrum, between the two services. Such analyses have been undertaken in Europe and elsewhere and have proved beneficial in trying to understand and quantify the issues that would be able to answer such a question.⁵

However it is not easy to arrive at a definitive answer, not least because :

- It is very hard to quantify social benefits, but that such benefits are associated with *both television and broadband*; and

⁴ *Testimony of Michael Calabrese, Vice President & Director, Wireless Future Program, New America Foundation Committee on Energy and Commerce Subcommittee on Communications, Technology and the Internet United States House of Representatives Washington, D.C. December 15, 2009*

⁵ See http://www.gsmworld.com/our-work/public-policy/spectrum/digital-dividend/links_to_useful_documents.htm

- The rapid growth in demand for broadband internet is fundamentally changing the broadcast and mobile industries, and these changes have yet to be fully realized.

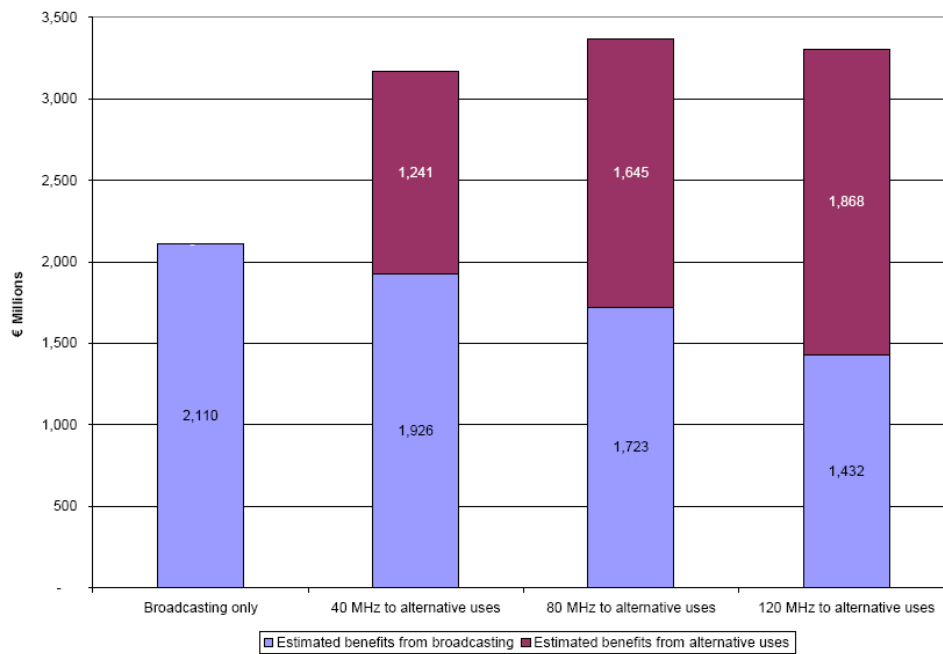
The GSMA however believes that some trends are becoming axiomatic, namely that:

- The demand for over-the-air terrestrial television is being eroded by internet based viewing (as made clear by the flow of advertising revenues from terrestrial television to the internet) – as well as cable and satellite;
- That access to broadband is not a luxury, but an essential for economic well being and social inclusion; and
- That mobile is a fundamental provider of broadband, particularly in rural areas, and requires harmonized spectrum to ensure economically efficient geographic coverage.

II. INTERNATIONAL EXPERIENCE IN COMPARING OPPORTUNITY COSTS AND BENEFITS FOR OVER-THE AIR TELEVISION

In Europe and elsewhere, a number of economic studies have been carried out to examine the costs and benefits of spectrum assigned to television broadcasting, versus new services such as mobile broadband, in the UHF bands. These studies were undertaken in advance of decisions made to award digital dividend spectrum in Europe. A typical example would be that undertaken for the Irish regulator. Its final output is summarized in the diagram below.

Europe Economics⁶: How can Ireland best benefit from DD (October 2008)



The approach adopted is to calculate the combined value of economic benefits. It can be seen they are maximized when between 80 and 120 MHz of spectrum is awarded to mobile broadband services. One of the key findings was that once the initial benefits associated with broadcasting are guaranteed, then there is little scope for increasing this, by awarding more spectrum (Section 1.9).

This is a pattern that has been repeated in other studies, and the GSMA believes that is applicable in the US market. Whilst it is certainly true that television broadcasting offers a significant benefit in social value, it is also true that wider access to broadband also offers social welfare value. Mobile broadband is particularly well suited to rural coverage, and offers significant operational and capital savings, over the use of higher bands. Therefore the question becomes one about at what point the marginal social value of an extra television spectrum block equals the marginal value of an extra block of spectrum for mobile broadband services.

⁶ http://www.comreg.ie/_fileupload/publications/CP50e.pdf

In a study by Spectrum Value Partners,⁷ Section 11.2.1 notes that this is further complicated by the fact that one must also make decisions about broadcast network quality. For example the geographic coverage required or the quality of the signal strength (i.e., is it suitable for portable or fixed/roof-top mounted aerals). Decisions made on these factors will also need to be part of any cost benefit analysis. The higher the conditions imposed on broadcast requirements (coverage areas and field strength) the more spectrum will be required (all other things being equal).

III. FUTURE TRENDS IN BROADCASTING INTERNATIONALLY AND HOW THESE MIGHT IMPACT ON US SPECTRUM REQUIREMENTS FOR OVER-THE-AIR TELEVISION SERVICES

The way that citizens view television is currently in a state of flux, and this is due to two main factors, namely:

- The impact of alternative delivery platforms, such as cable and satellite; and
- The widespread availability of the internet and broadband.

This has resulted in a shift from the traditional viewing pattern of most viewers. A GSMA-commissioned study conducted by Human Capital found that “[f]ragmentation of audiences and the number of channels already available on DTT⁸ mean that further SD services would be likely to have small audiences. As a result, DTT may not prove a cost effective transmission mechanism for such niche channels.”⁹

The study found for example that internet based television was a more cost effective solution in the UK, when audience shares started to drop below a certain level. This level

⁷ <http://www.gsmworld.com/documents/Spectrum-Getting-the-most-out-of-the-digital-dividend-2008.pdf>

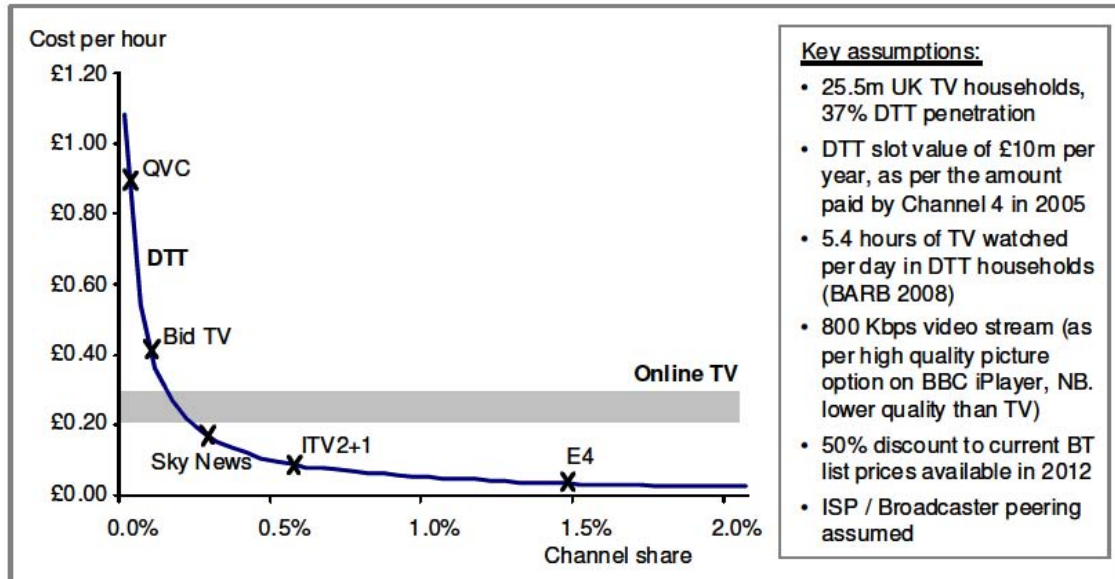
⁸ Digital Terrestrial Television

⁹

<http://www.humancapital.co.uk/gsma/The%20Limits%20to%20Terrestrial%20Television%27s%20Case%20For%20Further%20Spectrum.pdf>

depends on local market characteristics, such as digital terrestrial television penetration and the availability and cost of broadband services.

Figure 13: Indicative delivery cost per hour via DTT and online TV in the UK



Such an analysis for the US would help to indicate to what extent it may be more economically efficient to move niche television channels away from using the scarce resource of radio spectrum.

This pattern is similar to the affect of the rise in importance and economic value associated with such “Long Tails”. This is set out in Chris Anderson’s book of the same name, and his analysis of the retail book market. Namely that the value associated with the long tail starts to dominate, because the integral of area (of the above curve) to the right of say of ITV2+1, is greater than the part to the left of it. This area represents viewers/subscribers, and hence is a measure of revenue (and consumer surplus).

An interesting example of the change that we are seeing internationally is the flow of advertising revenue away from terrestrial television to the internet. For example in the UK,

Google's advertising revenue exceeded that of the main terrestrial television commercial operator in the year 2007.¹⁰

As is noted in the FCC document, there is also scope to improve the spectrum efficiency of broadcasting, by the adoption of the latest video compression techniques. In a study for Europe primarily, by Spectrum Value Partners¹¹ stated that "*MPEG4 is more efficient than MPEG2 as it uses approximately 67% of the spectrum required by MPEG2 broadcasts; this is expected to improve to 50% over time.*" (Section 11.2.3). However this would require new consumer set-top boxes. The study suggests that this might be done using the natural replacement cycle of set-top boxes.

IV. THE IMPORTANCE OF INTERNATIONAL SPECTRUM HARMONIZATION IN REDUCING TERMINAL COSTS

At the GSMA we have seen a recent change in attitudes to this subject by some Administrations. On the face of it, with nearly a billion mobile devices produced each year, there should be little scope for economies of scale from international frequency harmonization. However the issue is more complex, and as an industry we understand that the practical reality is that small markets significantly increase costs, and reduce device choice for consumers. A study commissioned by the GSMA with RTT¹² showed that there is a significant disincentive for vendors and component manufacturers to divert scarce engineering development and production resource away from mass markets, as this is where the majority of their profits are derived from. Not only do vendors forgo this profit, but they weaken their future position because their

¹⁰ Guardian.co.uk 18th April 2008.

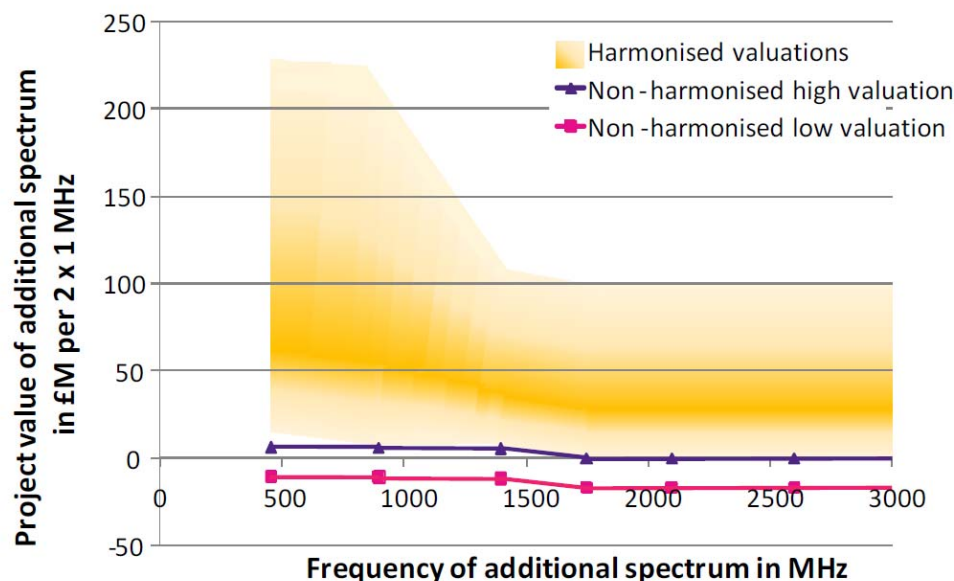
¹¹ <http://www.gsmworld.com/documents/Spectrum-Getting-the-most-out-of-the-digital-dividend-2008.pdf>

¹² http://www.gsmworld.com/our-work/public-policy/spectrum/digital-dividend/frequency_harmonisation.htm

competitors can “steal a march” on them. There are two main ways of expressing this, in terms of device cost, and the efficient design of the device (for example radio performance).

In a recent study by Plum Consulting for the UK regulator, Ofcom¹³, it was shown that the value of spectrum (based on net present value calculations over a number of years) is significantly altered by this factor. The study states that :

“The results show spectrum values ranging from zero to £240M per 2 x 1 MHz based on an evaluation period of 10 years and depending upon the input assumptions. Under the low case assumptions, non-harmonised spectrum value for cellular mobile applications is negative, although under the high case assumptions there is a significant positive value. This illustrates the reliance of the mobile industry on spectrum harmonisation when seeking new bands for advanced services”



Source: Plum analysis

Obviously the exact impact on costs and radio performance will vary depending on market size and other local factors¹⁴. However the work strongly re-enforces the view that international harmonization is vital for mass market services such as mobile. The GSMA

¹³

http://www.ofcom.org.uk/research/technology/research/spec_future/speceestimate/speceestimate.pdf

¹⁴

For example see Global View Partners on AWS spectrum in the Americas at http://www.gsmworld.com/documents/momentum_building_in_the_aws_band_report.pdf

believes that such benefits are beneficial to at least a regional scale, and that even markets the size of the US will still gain significant benefits from international harmonization of frequency bands.

V. **WHAT IMPLICATIONS THE NEED FOR INTERNATIONAL HARMONIZATION MIGHT HAVE ON US POLICY**

As was revealed by the US auction in March 2008, there is strong industry demand for spectrum for mobile broadband services the UHF bands. The likely technology to be deployed in the UHF band, in the US and elsewhere, is 3GPP Long Term Evolution (LTE)¹⁵. Such technologies are optimized to ensure the best spectral efficiency and the user experience. As such it relies on technologies (such as OFDM) that can best deliver these requirements.¹⁶ However to do so they require larger spectrum blocks.

All other things being equal then, if spectrum could be identified for mobile broadband in this band it should be contiguous, and probably from the top edge of the band. This would place them adjacent to the current spectrum awarded, starting at around 698 MHz. This would also allow broadcasters to use the lowest bands, which give the greatest signal coverage.

A further helpful step may involve pursuing bilateral and multilateral discussions on the potential of these new bands. Initially this could be done through CITEL, and then be progressed through the ITU process.

There is the potential to place the need for a further harmonized spectrum band for mobile broadband¹⁷ at the next ITU World Radiocommunication Conference (WRC) in the year 2012. It would then be possible to place it on the agenda for the following WRC (15). This

¹⁵ <http://www.3gpp.org/LTE>

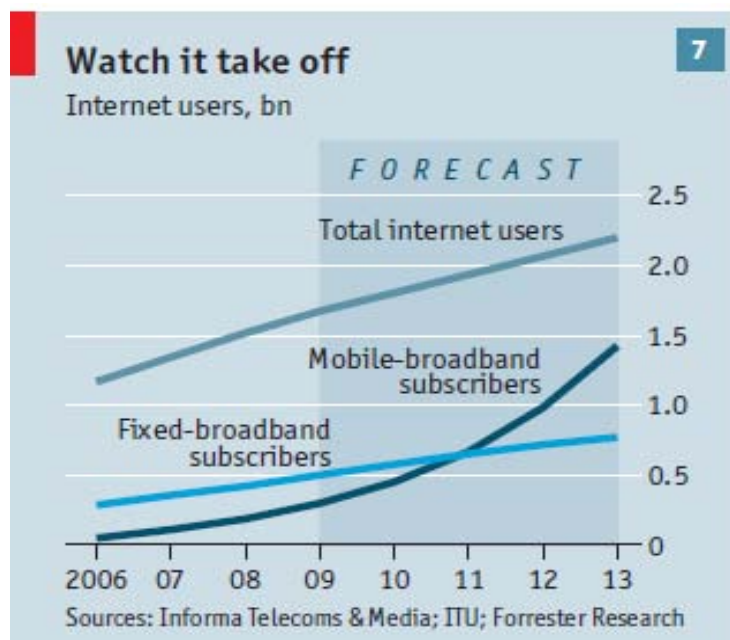
¹⁶ *Id.*

¹⁷ IMT as it is known in the ITU.

would make it possible to identify regionally, or even globally, a harmonized spectrum band. It is the GSMA's understanding that the best chance for a WRC agenda item to be placed on the agenda of WRC15, requires it to be agreed at WRC12.

VI. CONCLUSION

The GSMA believes that the current UHF bands under discussion offer a significant benefit to help boost rural and indoor broadband penetration in many markets. Whilst the US has awarded spectrum in the 700 MHz band recently, demand for mobile broadband is growing exponentially. "The Economist" recently published a report¹⁸ that showed that globally, mobile broadband was well placed to overtake fixed as the means of delivering broadband in the year 2011.



The drive will be on mobile operators to be able to offer the ever higher data rates that subscribers will come to expect and demand. It is of course difficult to look into the future and be definitive on what they may be. Services such as YouTube and Google would have been

¹⁸ Economist special report : "Mobile marvels" – Sept. 09

almost impossible to predict before their launch, as mass market services. What is almost certain is that the internet will continue to innovate, and the demand for broadband will continue to grow. Without access to sufficient and suitable spectrum, US consumers and US competitiveness internationally stand to lose out.

To prevent this happening requires that spectrum that is both contiguous and can be internationally harmonized be identified and made available in the timescales required.

Respectfully Submitted,

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